

Roll No.:

Test Date: 06-08-2017



A I A T S

ALL INDIA AAKASH TEST SERIES

for **MEDICAL**
Entrance Exams - 2018

National Eligibility-cum-Entrance Test (NEET)

TEST No.1

(XII Studying Students)

INSTRUCTIONS FOR CANDIDATES

1. Read each question carefully.
2. It is mandatory to use Blue/Black Ball Point Pen to darken the appropriate circle in the answer sheet.
3. Mark should be dark and should completely fill the circle.
4. Rough work must not be done on the answer sheet.
5. Do not use white-fluid or any other rubbing material on answer sheet. No change in the answer once marked.
6. Student cannot use log tables and calculators or any other material in the examination hall.
7. Before attempting the question paper, student should ensure that the test paper contains all pages and no page is missing.
8. Each correct answer carries four marks. One mark will be deducted for each incorrect answer from the total score.
9. Before handing over the answer sheet to the invigilator, candidate should check that PSID/User ID, Roll No. and Centre Code have been filled and marked correctly.
10. Immediately after the prescribed examination time is over, the answer sheet to be returned to the invigilator.

Note : It is compulsory to fill Roll No. and Test Booklet Code on answer sheet, otherwise your answer sheet will be rejected.



Aakash

Medical | IIT-JEE | Foundations

(Divisions of Aakash Educational Services Pvt. Ltd.)

Time : 3 Hrs.

TEST - 1

MM : 720

[PHYSICS]

$$F = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2}$$

$$\epsilon_0 = \frac{10^{-1} C^2 m^{-2}}{F}$$

Choose the correct answer :

1. The unit of electric permittivity is
 (1) $A^2 N^{-1} m^{-2}$ (2) $C^2 N^{-1} m^{-1}$
 (3) $C^2 N m^{-1}$ (4) $F m^{-1}$
2. The electric field lines
 (1) Are the trajectories of a positive test charge
 (2) Are vectors in the direction of the electric field
 (3) Cross each other in the region between two unlike point charges
 (4) Do not form closed loops
3. In a certain region of space the electric potential increases uniformly from east to west and does not vary in any other direction. The electric field
 (1) Points east and varies with position
 (2) Points east and does not vary with position
 (3) Points west and varies with position
 (4) Points west and does not vary with position
4. A closed solid conductor of irregular shape is given some charge. Which of the following statement is correct?
 (1) Potential of conductor will change if its shape is changed
 (2) Electric field inside it is non-zero
 (3) All points on its surface will have same-charge density
 (4) All of these
5. The electric field decreases most rapidly, with distance for
 (1) Point charge (2) Large charge sheet
 (3) Long line charge (4) Short electric dipole
6. Electric field lines in the space surrounding a charge distribution show
 (1) The paths that static charges would take
 (2) The directions in which static positive charge would accelerate when passing through points on those lines
 (3) The paths that moving charges would take
 (4) All of these
7. Which of the following statements concerning the electric field inside a conductor is true?
 (1) The electric field inside a conductor is never zero
 (2) The electric field inside a conductor is always zero
 (3) The electric field inside a conductor is always zero, unless there is an excess charge inside the conductor
 (4) The electric field inside a conductor can only be non-zero, if the charge carrier inside the conductor are drifting
8. Choose the incorrect statement.
 (1) Gauss law can be verified from Coulomb's law
 (2) Coulomb's law can be verified from Gauss law and symmetry
 (3) Gauss law applies to a closed surface of any shape
 (4) According to Gauss law, if a closed surface encloses no charge, then the electric field must vanish everywhere on the surface

Space for Rough Work

$$F = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2}$$

$$\epsilon_0 = \frac{1}{F} \frac{C^2}{m^2}$$

$$N^{-1} C^2 m^2$$

9. A charge -2 nC is fixed at each of the points $x = 1 \text{ cm}$, $x = 2 \text{ cm}$, $x = 4 \text{ cm}$, $x = 8 \text{ cm}$, $x = 16 \text{ cm}$, ..., $x = \infty$ on the x -axis. The electric potential at origin ($x = 0$), due to this system of charges, is

(1) -36 volt (2) -1800 volt
(3) -3600 volt (4) -5400 volt

10. An α -particle is projected with a kinetic energy of 18 eV from infinity towards a fixed point charge 20 pC . The distance of closest approach of the α -particle, from the fixed point charge, is

(1) 2 cm (2) 4 cm
(3) 6 cm (4) 9 cm

11. An α particle, initially at rest, moves through a certain distance in a uniform electric field in time t_1 . A proton, also initially at rest, takes time t_2 to move through an equal distance in the same uniform electric field.

Neglecting the effect of gravity, the ratio $\frac{t_1}{t_2}$ is equal to

(1) $1:\sqrt{2}$ (2) $\sqrt{2}:1$
(3) $1:2\sqrt{2}$ (4) $2\sqrt{2}:1$

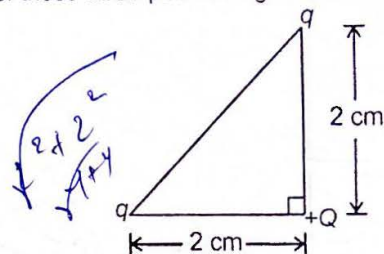
12. Eight identical spherical liquid drops are each at a potential 2 volt . They coalesce to make one big spherical liquid drop, whose potential is

(1) $\frac{1}{4} \text{ V}$ (2) 16 V
(3) 8 V (4) $\frac{1}{2} \text{ V}$

13. Three capacitors $C_1 = 3 \mu\text{F}$, $C_2 = 6 \mu\text{F}$ and $C_3 = 12 \mu\text{F}$ are joined in series. This series combination is connected to a 14 volt source. The P.D across the plates of capacitor C_2 is

(1) 2 volt
(2) 4 volt
(3) 6 volt
(4) 8 volt

14. Three charges $+Q$, q and q are placed at the vertices of a right angled isosceles triangle as shown in figure. The net electrostatic potential energy of the system of these three point charges is zero, if q is equal to

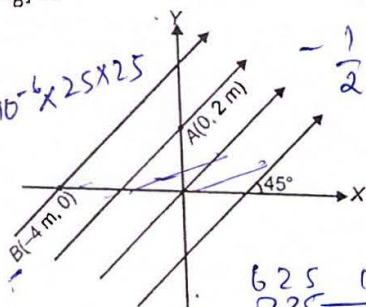


(1) $-\frac{Q}{\sqrt{2}}$ (2) $-2\sqrt{2} Q$
(3) $-\frac{Q}{3\sqrt{2}}$ (4) $-4\sqrt{2} Q$

15. Two parallel plate capacitors having capacitances $6 \mu\text{F}$ and $3 \mu\text{F}$ are charged to potentials 25 V and 15 V respectively. If the plates of unlike polarity of the two capacitors are connected together, then the loss in energy is

(1) $100 \mu\text{J}$ (2) $450 \mu\text{J}$
(3) $1600 \mu\text{J}$ (4) $7200 \mu\text{J}$

16. A uniform electric field of $50\sqrt{2} \text{ Vm}^{-1}$, exists in XY plane, making an angle of 45° with positive X axis as shown in below figure. The potential difference $[V_A - V_B]$ is



(1) $-300\sqrt{2} \text{ V}$
(3) $+300\sqrt{2} \text{ V}$

(2) -300 V
(4) $+300 \text{ V}$

Space for Rough Work

Handwritten calculations for Question 9:

$$V = kq \left(\frac{1}{x} + \frac{1}{2x} + \frac{1}{4x} + \dots \right)$$

$$V = kq \left(\frac{1}{x} \left(1 + \frac{1}{2} + \frac{1}{4} + \dots \right) \right)$$

$$V = kq \left(\frac{1}{x} \cdot 2 \right) = \frac{2kq}{x}$$

For $x = 1 \text{ cm}$, $q = -2 \text{ nC}$:

$$V = \frac{2 \times 9 \times 10^9 \times (-2 \times 10^{-9})}{0.01} = -3600 \text{ V}$$

Handwritten calculations for Question 12:

$$8 \text{ drops} \rightarrow 1 \text{ big drop}$$

$$8 \times (2 \text{ V})^3 = (V)^3$$

$$8 \times 8 = V^3$$

$$64 = V^3$$

$$V = 4 \text{ V}$$

Handwritten calculations for Question 13:

$$\frac{1}{C_{\text{eq}}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$$

$$\frac{1}{C_{\text{eq}}} = \frac{1}{3} + \frac{1}{6} + \frac{1}{12}$$

$$\frac{1}{C_{\text{eq}}} = \frac{4}{12} + \frac{2}{12} + \frac{1}{12} = \frac{7}{12}$$

$$C_{\text{eq}} = \frac{12}{7} \mu\text{F}$$

$$Q = CV = \frac{12}{7} \times 14 = 24 \mu\text{C}$$

Handwritten calculations for Question 16:

$$V_A - V_B = -\int_B^A \vec{E} \cdot d\vec{r}$$

$$V_A - V_B = -\int_{(-4,0)}^{(0,2)} 50\sqrt{2} \cos(45^\circ) dx + 50\sqrt{2} \sin(45^\circ) dy$$

$$V_A - V_B = -50 \int_{-4}^0 dx + 50 \int_0^2 dy$$

$$V_A - V_B = -50(0 - (-4)) + 50(2 - 0)$$

$$V_A - V_B = -200 + 100 = -100 \text{ V}$$

17. The electric potential at a point (x, y, z) in space is given by $V = [x^2y - y^2z - z^2x]$ V. The electric field at the point $[-1 \text{ m}, -1 \text{ m}, -1 \text{ m}]$ is

(1) $[\hat{i} - \hat{j} - \hat{k}] \text{Vm}^{-1}$ (2) $[\hat{i} - \hat{j} - 3\hat{k}] \text{Vm}^{-1}$

(3) $[-\hat{i} + \hat{j} + 3\hat{k}] \text{Vm}^{-1}$ (4) $[-\hat{i} + \hat{j} + \hat{k}] \text{Vm}^{-1}$

18. A solid conducting sphere of radius R and charge $[2Q]$ is surrounded by an uncharged concentric conducting hollow spherical shell of radius $2R$. Let V is the potential difference between the surface of the solid sphere and that of the outer surface of the hollow spherical shell. If the shell is now given a charge of $[-4Q]$, then the new potential difference between the same two surfaces is

(1) $-2V$ (2) $4V$

(3) $+2V$ (4) V

19. Two identical metal plates A and B are given charges $+20 \mu\text{C}$ and $-60 \mu\text{C}$ respectively. Now the plates A and B are brought close together to form a parallel plate capacitor of capacitance $20 \mu\text{F}$. The potential difference between the plates A and B is

(1) 2 V (2) 4 V

(3) 6 V (4) 8 V

20. A point charge Q is located at a distance $\frac{R}{2}$ from the centre of an uncharged conducting spherical shell as shown in below figure. The electric field at a distance $3R$ from the point charge is

(1) $\frac{1}{4\pi\epsilon_0} \frac{Q}{9R^2}$

(2) $\frac{1}{4\pi\epsilon_0} \frac{Q}{\left(\frac{5R}{2}\right)^2}$

(3) $\frac{1}{4\pi\epsilon_0} \frac{Q}{\left(\frac{7R}{2}\right)^2}$

(4) $\frac{1}{4\pi\epsilon_0} \frac{Q}{\left(\frac{9R}{2}\right)^2}$

21. In the circuit shown below, $C_1 = 3 \mu\text{F}$; $C_2 = 6 \mu\text{F}$; $C_3 = 6 \mu\text{F}$; $C_4 = 12 \mu\text{F}$ and $C_5 = 9 \mu\text{F}$. The total energy stored in these five capacitors is

(1) $3 \mu\text{J}$ (2) $12 \mu\text{J}$

(3) $24 \mu\text{J}$ (4) $6 \mu\text{J}$

22. There is a uniformly charged non-conducting sphere of radius $R = 8 \text{ cm}$ and volume charge density, $\rho = 27 \times 10^{-3} \text{ C/m}^3$, as shown below. If V_C and V_D are the electric potentials at points C and D

respectively, then the ratio $\left[\frac{V_C}{V_D}\right]$ is

(1) $\frac{28}{27}$

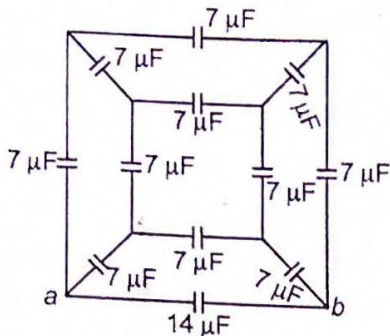
(2) $\frac{12}{11}$

(3) $\frac{27}{12}$

(4) $\frac{54}{51}$

Space for Rough Work

23. The effective capacitance between the points a and b in the network shown below is

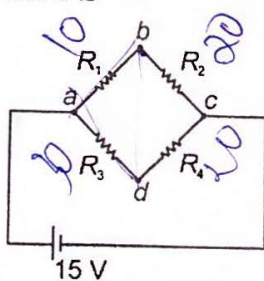


- (1) $\frac{49}{12} \mu\text{F}$ (2) $21 \mu\text{F}$
(3) $15 \mu\text{F}$ (4) $19 \mu\text{F}$

24. Three heater coils H_1 , H_2 and H_3 rated $[1000 \text{ W}; 100 \text{ V}]$, $[1500 \text{ W}; 100 \text{ V}]$ and $[2000 \text{ W}; 100 \text{ V}]$ individually take a time interval of 12 minutes, 6 minutes and 4 minutes respectively to generate the same quantity of heat Q when connected to a 100 V source. Now these three coils are connected in parallel and this parallel combination is connected to a 50 V source. The time interval taken by this parallel combination of coils to generate the same quantity of heat Q is

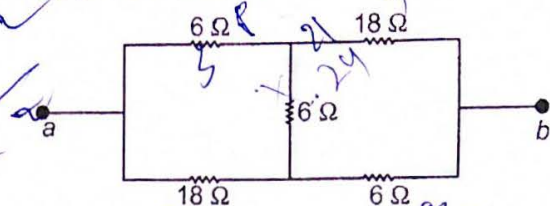
- (1) 2 minutes (2) 6 minutes
(3) 8 minutes (4) 12 minutes

25. In the circuit shown, $R_1 = 10 \Omega$; $R_2 = 20 \Omega$; $R_3 = 30 \Omega$ and $R_4 = 20 \Omega$. Potential difference between b and d is



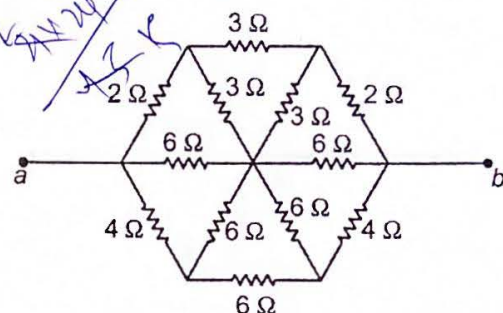
- (1) 1 V (2) 2 V
(3) 3 V (4) 4 V

26. In the circuit shown, the effective resistance between the points a and b is



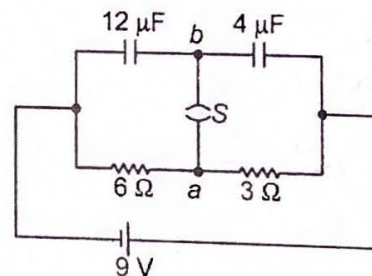
- (1) 3Ω (2) 5Ω
(3) 6Ω (4) 10Ω

27. In the circuit shown, the effective resistance between the points a and b is



- (1) 1.5Ω (2) 2Ω
(3) 2.5Ω (4) 3Ω

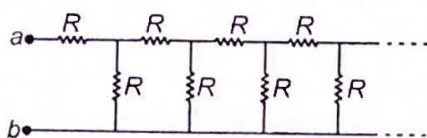
28. For the circuit shown below, when the switch S is closed, then the total amount of charge that flows from point a to point b through the switch, is



- (1) $84 \mu\text{C}$ (2) $99 \mu\text{C}$
(3) $60 \mu\text{C}$ (4) $39 \mu\text{C}$

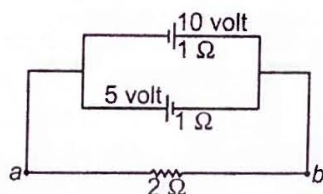
Space for Rough Work

29. In the infinite ladder network shown below, if $R = 1.235 \Omega$, then the effective resistance between the points a and b (approximately) is ($\sqrt{5} = 2.235$)

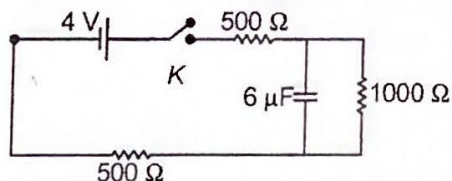


- (1) 0.145Ω (2) $\left[\frac{\sqrt{5}-1}{2} \right] \Omega$
 (3) 2Ω (4) $\left[\frac{\sqrt{3}+5}{2} \right] \Omega$

30. The current through the 2Ω resistor in the circuit shown below is

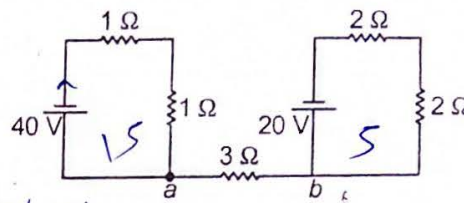


- (1) 3 A from a to b (2) 3 A from b to a
 (3) 2 A from b to a (4) 1 A from b to a
31. In the circuit shown below, if the tap key K is pressed at time $t = 0$, then which of the following statements is false?



- (1) At time $t = 0$; current delivered by battery = 4 mA
 (2) At time $t = \infty$; current delivered by battery = 2 mA
 (3) At time $t = \infty$; charge on capacitor = $6 \mu\text{C}$
 (4) At time $t = \infty$; charge on capacitor = $12 \mu\text{C}$

32. The current flowing through the 3Ω resistor, in the circuit shown below, is

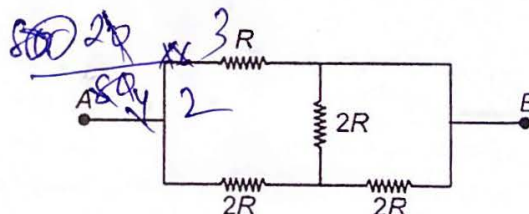


- (1) 15 A from a to b
 (2) 15 A from b to a
 (3) 25 A from a to b
 (4) No current will flow through 3Ω resistor

33. The length of meter bridge wire is 100 cm. A resistance of 6Ω is connected across the left gap and an unknown resistance Q , ($Q > 6 \Omega$), is connected across the right gap. When these resistances are interchanged, the balance point shifts by 20 cm. The value of resistance Q is

- (1) 9Ω
 (2) 12Ω
 (3) 18Ω
 (4) 15Ω

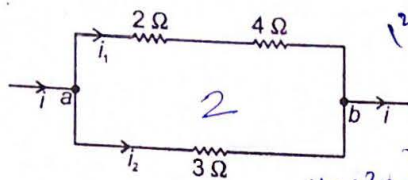
34. The equivalent resistance between A and B is



- (1) $\frac{2R}{7}$
 (2) $\frac{5R}{7}$
 (3) $\frac{4R}{5}$
 (4) $\frac{3R}{4}$

Space for Rough Work

35. In the circuit shown, the heat generated in the $4\ \Omega$ resistor due to the current flowing in it is $6\ \text{J/s}$. The heat generated in the $3\ \Omega$ resistor is



- (1) 3 joule/second (2) 6 joule/second
(3) 18 joule/second (4) 36 joule/second

36. Two Bulbs B_1 and B_2 rated $[25\ \text{W}; 100\ \text{V}]$ and $[50\ \text{W}; 50\ \text{V}]$ respectively are connected in series and this series combination is connected to a $150\ \text{V}$ source. Which one of the following options is correct?

- (1) Total power consumed by the two bulbs is $75\ \text{W}$
(2) Power consumed by bulb B_1 is $15\ \text{W}$
(3) Bulb B_1 will blow out
(4) Both the bulbs B_1 and B_2 will blow out

In a potentiometer experiment, the balancing length for a cell is found to be $160\ \text{cm}$. When a resistance of $2\ \Omega$ is connected across the terminals of the cell, the balancing length becomes $40\ \text{cm}$. The internal resistance of the cell is

- (1) $\frac{8}{3}\ \Omega$ (2) $\frac{2}{3}\ \Omega$
(3) $\frac{3}{4}\ \Omega$ (4) $6\ \Omega$

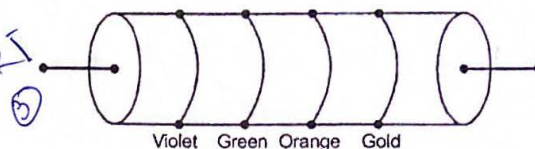
38. The resistance of a conductor at temperatures 25°C and 10°C are $10\ \Omega$ and $5\ \Omega$ respectively. The resistance of the conductor at 55°C is

- (1) $20\ \Omega$
(2) $30\ \Omega$
(3) $35\ \Omega$
(4) $40\ \Omega$

39. The ratio of the resistances of three wires, whose lengths are in the ratio $2 : 3 : 5$ and masses in the ratio $4 : 2 : 1$, made up of same material is

- (1) $2 : 9 : 50$ (2) $6 : 12 : 25$ $R = \frac{\rho L}{a}$
(3) $30 : 10 : 3$ (4) $8 : 6 : 5$

40. The resistance of the resistor shown below is



- (1) $[75 \times 10^3]\ \Omega \pm 5\%$ (2) $[74 \times 10^3]\ \Omega \pm 5\%$
(3) $[75 \times 10^3]\ \Omega \pm 10\%$ (4) $[76 \times 10^3]\ \Omega \pm 5\%$

41. A metal wire has a length of $2\ \text{m}$, diameter $4\ \text{mm}$, and resistance $16\ \Omega$. The density of the material of the wire is $9000\ \text{kg m}^{-3}$. The wire is stretched so that its diameter becomes $2\ \text{mm}$. The resistance of the wire, upon stretching, is

- (1) $256\ \Omega$ (2) $64\ \Omega$
(3) $4\ \Omega$ (4) $1\ \Omega$

42. An electron revolves in a circular orbit of radius $0.5\ \text{\AA}$ with a frequency of 5×10^{16} revolution/second. The current in that circular orbit is

- (1) $4\ \text{mA}$
(2) $8\ \text{mA}$
(3) $16\ \text{mA}$
(4) $2\ \text{mA}$

43. Which one of the following statements concerning Ohm's law is true?

- (1) Ohm's law is true for all materials
(2) Ohm's law is true for all conductors
(3) Ohm's law is true for all semiconductors
(4) Ohm's law is true when the resistivity of a material is independent of the applied electric field

Space for Rough Work

44. A steady current flows in a metal wire of non-uniform cross-section. Which quantity remains constant along the length of the wire?

- (1) Electric field strength
- (2) Current Density
- (3) Drift speed of the free electrons
- (4) Mobility of the free electrons

45. The dimensional formula of "Electron mobility" is

- (1) $[M^0 L^1 T^{-1} A^{-1}]$
- (2) $[M^1 L^0 T^{-1} A^{-1}]$
- (3) $[M^{-1} L^2 T^2 A]$
- (4) $[M^{-1} L^0 T^2 A]$

[CHEMISTRY]

46. If $LiBH_4$ crystallises in an orthorhombic system having volume of each unit cell as $216.3 \times 10^{-24} \text{ cm}^3$ and 4 molecules per unit cell, then the density of the crystal will be (Molar mass of $LiBH_4$ is 21.76 g/mole)

- (1) 0.668 g/cm³
- (2) 0.725 g/cm³
- (3) 0.805 g/cm³
- (4) 0.612 g/cm³

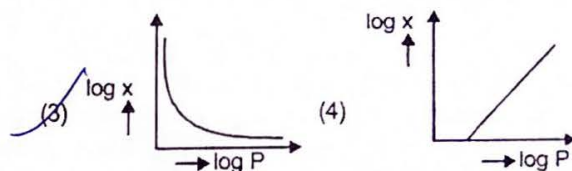
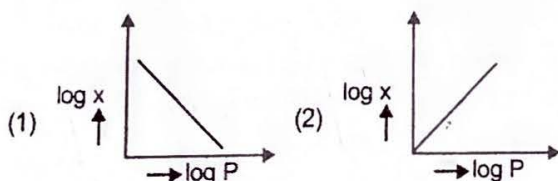
47. Ratio of four fold axis of symmetry and diagonal plane of symmetry in a cubic unit cell is

- (1) 1 : 2
- (2) 3 : 4
- (3) 2 : 3
- (4) 4 : 3

48. At 25°C, the osmotic pressure of each 0.01 M solutions of AB_2 and sucrose ($C_{12}H_{22}O_{11}$) are 0.38 atm and 0.16 atm respectively. The van't Hoff factor for AB_2 will be

- (1) 4.25
- (2) 2.37
- (3) 3.72
- (4) 2.89

49. Which of the following graphs represents Henry's law? (Where x = mole fraction of dissolved gas, $K_H = 2000 \text{ kbar}$)



50. On mixing, which of the following liquid mixture show contraction in volume?

- (1) Methanol + water
- (2) Acetone + aniline
- (3) Acetone + benzene
- (4) Acetone + carbon disulphide

51. How much is the oxidising power of MnO_4^- / Mn^{2+} will change if the $[H^+]$ is changed from 1 M to 10^{-4} M at 25°C?

- (1) 0.26
- (2) 0.38
- (3) 0.45
- (4) 0.62

52. The mass of benzene that would be required to produce a current of one ampere for 4 hours is



- (1) 0.543 g
- (2) 0.312 g
- (3) 0.387 g
- (4) 1.75 g

Space for Rough Work

53. Resistance of a 0.1 M KCl solution in a conductance cell is 200 ohm and conductivity is 0.015 S cm^{-1} . The value of cell constant is

(1) 4.5 cm^{-1} (2) 3.0 cm^{-1}
(3) 6.3 cm^{-1} (4) 5.2 cm^{-1}

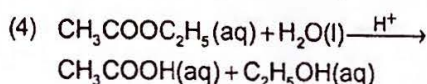
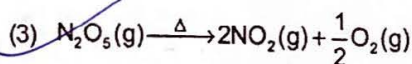
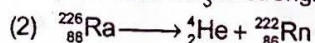
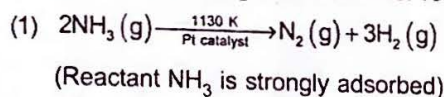
54. 100 g fairly concentrated solution of CuSO_4 is electrolysed using 0.1 F electricity. The weight of resulting solution is (Atomic weight of Cu = 63.5)

(1) 96.02 g (2) 98.6 g
(3) 94.5 g (4) 91.2 g

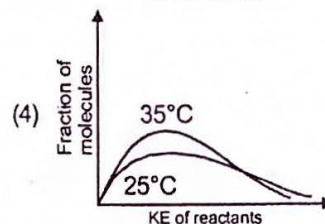
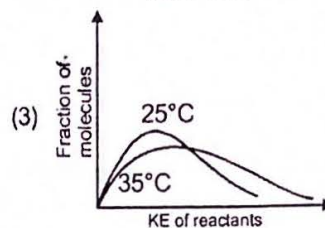
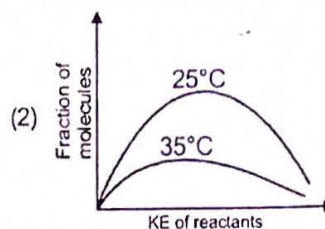
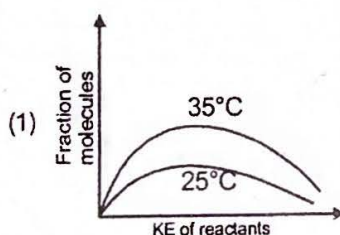
55. Half life of a chemical reaction at a particular concentration is 75 min. When the concentration of the reactant is doubled, the half life becomes 150 min. What is the order of reaction?

(1) First order (2) Zero order
(3) Second order (4) Third order

56. Which of the following is a zero order reaction?



57. Which of the following is the correct graph showing temperature dependence of rate of a reaction?



58. How many half lives are required to complete 93.75% of a first order reaction?

(1) 4 (2) 5
(3) 6 (4) 8

59. In which of the following defects density of crystal remain same?

(1) Schottky defect (2) Impurity defect
(3) Frenkel defect (4) F-centre defect

60. A cube of 1 m edge length is crushed in order to get small cubes of edge length 1 mm. By which factor does the surface area increase?

(1) 10^4 (2) 10^3
(3) 10^5 (4) 10^2

61. Which of the following has highest coagulating power for positively charged sol?

(1) $[\text{Fe}(\text{CN})_6]^{4-}$ (2) Al^{3+}
(3) Ba^{2+} (4) Cl^-

Space for Rough Work

99 Gold = 10
99.9%

62. Butter is an example of
 (1) True solution (2) Sol
 (3) Solid sol. (4) Gel
63. In Haber's process for the manufacture of ammonia, the catalyst and promoter are respectively
 (1) Finely divided Iron, Molybdenum
 (2) Platinized asbestos, Molybdenum
 (3) Molybdenum, V_2O_5
 (4) $CuCl_2$, V_2O_5
64. Which of the following is correct equation for Langmuir Adsorption Isotherm?
 (1) $\left(\frac{x}{m}\right) = KP^{(1/n)}$, $n \geq 1$ (2) $\left(\frac{x}{m}\right) = \frac{aP}{a+bP}$
 (3) $\left(\frac{x}{m}\right) = KC^{(1/n)}$ (4) $\left(\frac{x}{m}\right) = \frac{KP^2}{1+P}$
65. The crystal system having edge length, $a = b = c$ and interaxial angles, $\alpha = \beta = \gamma \neq 90^\circ$ is
 (1) Tetragonal (2) Rhombohedral
 (3) Orthorhombic (4) Hexagonal
66. In a ccp structure, if $\frac{2}{3}$ rd face-centred atoms are removed, then the percentage of occupied space in unit cell will be
 (1) 60% (2) 62.2% *78.1%*
 (3) 47.5% (4) 37%
67. KF has NaCl type structure. Its density is 3.48 g/cm^3 and its molar mass is 58 g/mol . The distance between K^+ and F^- ions will be
 (1) $5.23 \times 10^{-7} \text{ cm}$
 (2) $4.79 \times 10^{-10} \text{ cm}$
 (3) $2.395 \times 10^{-8} \text{ cm}$
 (4) $3.025 \times 10^{-9} \text{ cm}$
68. Select the incorrect statement
 (1) CrO_2 is a ferromagnetic substance
 (2) Fe_3O_4 is a ferrimagnetic substance
 (3) The conducting behaviour of VO_3 depends on temperature
 (4) TiO_3 behaves as conductor at all temperatures
69. The amount of ice that will separate out on cooling a solution containing 65 g of ethylene glycol in 250 g water to -9.3°C , is (K_f for water is $= 1.86 \text{ K mol}^{-1} \text{ kg}$)
 (1) 35 g (2) 40.33 g
 (3) 45.20 g (4) 22.60 g
70. What is the correct sequence of osmotic pressure of 0.01 M aq. solution of following salts? (assuming salts are 100% ionized)
 (A) $Al_2(SO_4)_3$ (B) $CaCl_2$
 (C) Glucose (D) $CaSO_4$
 (1) ~~A > B > D > C~~ (2) ~~B > D > A > C~~
 (3) ~~C > D > B > A~~ (4) ~~D > C > B > A~~
71. If on addition of 1 g of non-volatile, non-electrolyte solute in 180 g of water results in 0.1% lowering of vapour pressure of pure water, then the molar mass (g/mol) of solute will be
 (1) 99.9 (2) 109
 (3) 990 (4) 999
72. For three reactions namely A, B, C, the energy of the activation is 100 cal/mol, 80 cal/mol and 50 cal/mol respectively. Which of the following reaction shows maximum temperature effect?
 (1) A
 (2) B
 (3) C
 (4) All reactions show same temperature effect

Space for Rough Work

Handwritten notes:

$\frac{2}{7} \times 10^3$

$\frac{3}{10^2}$

10^{24}

$10^3 \times 10^3 \times 10^3$

$\frac{x}{2\sqrt{2}}$

$E_a \propto \frac{1}{T}$

Activation Energy is independent of temp?

73. For a reversible reaction, assuming that Arrhenius parameter of both reactions are same, then which of the following expression is correct? (k_f and k_b are the rate constants of forward and backward reactions respectively)

(1) $\frac{k_f}{k_b} = e^{\frac{-\Delta H}{2RT}}$

(2) $\frac{k_f}{k_b} = e^{\frac{\Delta H}{2RT}}$

(3) $\frac{k_b}{k_f} = e^{\frac{\Delta H}{RT}}$

(4) $\frac{k_f}{k_b} = e^{\frac{\Delta H}{RT}}$

74. If the rate of reaction becomes double when temperature is increased from 25°C to 35°C, then activation energy of the reaction (in kJ) will be

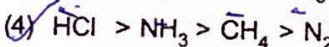
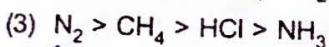
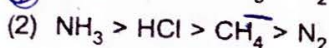
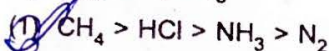
(1) 52.89 kJ

(2) 65.2 kJ

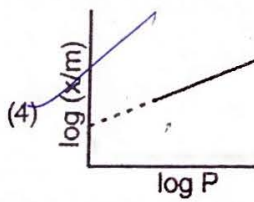
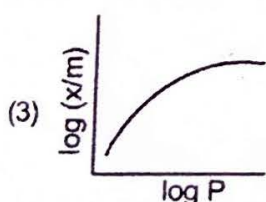
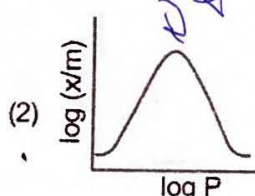
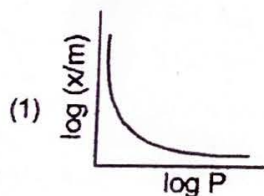
(3) 58.5 kJ

(4) 45.3 kJ

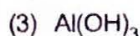
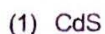
75. Arrange the following gases in decreasing order of their extent of physisorption



76. Which is the correct graph for freundlich adsorption isotherm (physical adsorption)?

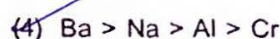
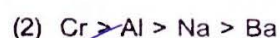
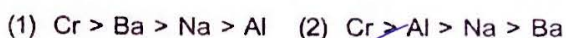


77. Which one of the following is a negatively charged sol?



78. Arrange the following metals in decreasing order of their oxidising power.

| Metal | E_{red}^0 (volt) |
|-------|--------------------|
| Ba | -2.90 |
| Al | -1.66 |
| Cr | -0.74 |
| Na | -2.71 |



79. The conductivity of water at 300 K is $0.75 \times 10^{-7} \text{ ohm}^{-1} \text{ cm}^{-1}$. The degree of dissociation of water is (Given: $\Lambda_{(H^+)}^\infty = 349.8 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$,

$\Lambda_{(OH^-)}^\infty = 197.2 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$)

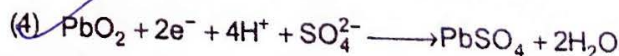
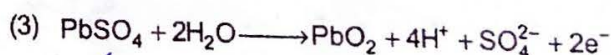
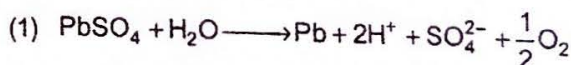
(1) 2.6×10^{-7}

(2) 3.5×10^{-8}

(3) 2.4×10^{-9}

(4) 3.2×10^{-8}

80. Which one of the following reactions take place at any electrode during charging of the lead storage battery used in the car?



Space for Rough Work

81. Gibb's free energy (ΔG) for the given cell will be
- $$\text{Cu(s)} | \text{Cu}^{2+} (1.5 \times 10^{-4} \text{ M}) || \text{Ag}^+ (4.5 \times 10^{-4} \text{ M}) | \text{Ag(s)}$$
- [Given, $E^\circ_{\text{Cu}^{2+}|\text{Cu}} = 0.34 \text{ V}$, $E^\circ_{\text{Ag}^+|\text{Ag}} = 0.80 \text{ V}$,
 $\log(1.5) = 0.176$, $\log(4.5) = 0.653$]
- (1) -59234 J (2) -64520 J
 (3) -72375 J (4) -92375 J
82. For a reaction, $\text{P} + \text{Q} \longrightarrow \text{products}$, the rate of reaction remain same when the concentration of P is tripled and rate increases by a factor of four when the concentration of Q is doubled, then overall order of reaction is
- (1) Zero (2) 1
 (3) 2 (4) 3
83. E° for the cell, $2\text{A(s)} + \text{B}^{2+}(\text{aq}) \longrightarrow 2\text{A}^+(\text{aq}) + \text{B(s)}$ is 0.591 V at 25°C , the equilibrium constant for the cell will be
- (1) 10^{10} (2) 10^{20} *K 0.059*
 (3) 10^2 (4) 10^8
84. In sodium oxide, having the antifluorite structure, the coordination number for Na^+ ion and oxide ion are respectively
- (1) 4 and 2 (2) 6 and 6 *891*
 (3) 8 and 4 (4) 4 and 8 *100*
85. Same quantity of electricity is being used to liberate iodine at anode and a metal (M) at cathode. The mass of metal liberated at cathode is 0.75 g and the liberated iodine completely reduced by 45 ml of 0.20 M sodium thiosulphate solution. What is the equivalent weight of metal?
- (1) 83.33 (2) 90.27
 (3) 101.5 (4) 76.4
86. The equivalent conductivity (in $\text{S cm}^2 \text{eq}^{-1}$) at infinite dilution of the salt NaKC_2O_4 will be
- (Given: the ionic conductance at infinite dilution of $\text{C}_2\text{O}_4^{2-}$, K^+ and Na^+ are 150.2, 52.3 and $74.5 \text{ } \Omega^{-1} \text{cm}^2 \text{mol}^{-1}$, respectively)
- (1) 122.5 (2) 138.5
 (3) 140.2 (4) 142.6
87. What is reduction potential of standard hydrogen electrode at 1 atm, 1 M and 25°C ?
- (1) 0 V (2) 1 V
 (3) 1.34 V (4) 0.34 V
88. At 27°C , the osmotic pressure of 8% (w/v) urea solution is
- (1) 65.26 atm
 (2) 32.84 atm
 (3) 46.16 atm
 (4) 36.12 atm
89. 0.1 molal aqueous solution of an quaternary-electrolyte AB_3 is 80% ionised. The boiling point of the solution at 1 atm is ($K_{b(\text{H}_2\text{O})} = 0.52 \text{ K kg mol}^{-1}$)
- (1) 273.19 K
 (2) 373.17 K
 (3) 374.92 K *89 1*
 (4) 376.4 K *100 5*
90. 1 molal aqueous solution of which of the following compound have maximum freezing point (assuming complete ionisation of each salt)?
- (1) $[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_3$
 (2) $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$
 (3) $[\text{Co}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$
 (4) $[\text{Co}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot 3\text{H}_2\text{O}$

Space for Rough Work

$$\sqrt[2]{100} = \sqrt{10}$$

$$\log K_0 = 20 \quad \sqrt[3]{4 \times 100}$$

$$\sqrt{10} \times \sqrt[3]{2}$$

$$\sqrt{20}$$

$$2 \times 100$$

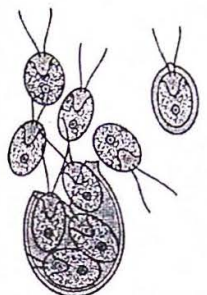
$$\sqrt[3]{2} \times \sqrt[3]{100}$$

$$\sqrt{20} \times \sqrt{10}$$

$$\sqrt{20}$$



[BIOLOGY]

91. How many of the following statements are correct for lifespan?
- It is not a specific trait of an organism.
 - It includes time duration between birth and natural death.
 - It usually depends upon size or complexity of organisms.
 - Mango tree has a much shorter lifespan as compared to a peepal tree.
 - It can be too short as one day in Mayfly.
- (1) One
(2) Two
(3) Three
(4) Four
92. Factors that are responsible for how organism reproduces is/are
- Habitat
 - Internal (physiology) factors
 - High specific gravity
 - Both (1) & (2)
93. Which one is not a feature of asexual reproduction?
- It can occur with or without gamete formation.
 - New organisms inherit all of its chromosomes from one parent
 - New individuals are formed even from the vegetative/somatic cells
 - It can occur only through unspecialised parts of parent
94. Consider the given figure w.r.t. asexual reproductive structures and select correct set of statements.
- 
- Microscopic motile spores.
 - Always formed in unfavourable conditions.
 - Development of exogenous asexual spores.
 - Zoospores in *Chlamydomonas* are pyramid shaped.
- (1) a & c
(2) b & d
(3) a & d
(4) c & d
95. Which one of the following pairs is wrongly matched?
- Penicillium* - Conidia
 - Sponge - Gemmules
 - Kalanchoe* - Runner
 - Ananas* - Bulbil
96. Choose the incorrect option for water hyacinth.
- Exotic weed introduced in Bengal for its beautiful flowers and shape of leaves
 - Highly invasive aquatic weed found growing in running water
 - It drains oxygen from the water
 - It reproduces vegetatively by offsets

Space for Rough Work

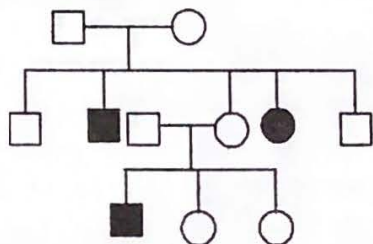
97. If a plant with genotype AABbCC produces tomatoes of 80 gram weight, while aabbcc produces tomatoes of 20 gram in weight. Which of the following combination is **correct** if the character is controlled by polygenes?

- (1) AaBbCc - 50 g
- (2) AaBBcc - 40 g
- (3) aaBbCC - 30 g
- (4) Aabbcc - 10 g

98. In which of the following organisms zygote develops a thick wall that is resistant to desiccation and damage?

- (1) *Pinus*, *Oryza*
- (2) *Pinus*, *Spirogyra*
- (3) *Marchantia*, *Rhizopus*
- (4) *Rhizopus*, *Spirogyra*

99. Given below is a pedigree chart showing the inheritance of a trait in humans.



The trait traced in the given pedigree chart is concerned with

- (1) Qualitative problem of synthesising an incorrectly functioning α -globin
- (2) Quantitative problem of synthesising too few globin molecules
- (3) Qualitative problem of synthesising too few β -globin molecules
- (4) Quantitative problem of synthesising an incorrectly functioning β -globin

100. Read the following four statements (A-D).

- A. The interflowering period in polycarpic plants is not the juvenile phase but is a part of the mature phase.
- B. Gametes arise from diploid parent body only.
- C. In *Chara*, egg is rich in proteins and starch only.
- D. Reduction division has to occur if a haploid body has to produce haploid gametes.

How many of the above statements is/are **correct**?

- (1) Two
- (2) Three
- (3) Four
- (4) One

101. A. Organisms exhibiting external fertilisation show great synchrony between the sexes and release a large number of gametes into the surrounding medium in order to enhance the chances of syngamy.

B. Internal fertilisation occurs in *Spirogyra*, bryophytes, pteridophytes, gymnosperms and angiosperms.

- (1) Only A is correct
- (2) Only B is correct
- (3) Both A & B are correct
- (4) Both A & B are incorrect

102. Choose the **correct** sequence w.r.t. ascending order of chromosome number in meiocyte of the following organisms (a-d).

- a. Butterfly
- b. Rat
- c. Onion
- d. Fruit fly

- (1) d, c, b & a
- (2) b, d, c & a
- (3) a, b, d & c
- (4) c, b, a & d

Butterfly 4
Rat 3
Onion 2
Fruit fly 1
Ascending order of chromosome number in meiocyte is d, c, b & a.
All except 1
Comp-1

Space for Rough Work

A B C

22 : 20 : 21

20g
20



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103. Read the following statements carefully.

- The most vital event of sexual reproduction is syngamy.
- Zygote is a vital link that ensures continuity of species between organisms of one generation and the next.
- In angiosperms, pollen grains are the carriers of motile male gametes.
- Ovary wall proliferates to form pericarp after fertilization.

Correct statements are

- a & c
- b & d only
- a, b & d
- All a, b, c & d

104. Inheritance of poky in the fungus pink mould is due to imbalance in the physiology of

- Kappa particles
- Mitochondria
- Chloroplast
- Nucleus

105. Mark odd one (w.r.t. pleiotropy)

- It is due to effect of the gene on two or more inter-related metabolic pathways that contribute towards different phenotypes
- In humans, it is exhibited by sickle cell anaemia
- It is essential that all the traits are equally influenced
- Both (2) & (3)

106. Which one of the following statement is correct w.r.t. typical angiospermic anther?

- It is bilobed and both lobes are separated by vasculated fertile tissue called connective
- The anther is trigonal structure
- Megasporangia are located at corners in each lobe
- Microsporangia form pollen sacs which on maturity become filled with pollen grains

107. The tapetal cells of anther show increase in their DNA content due to all, except

- Endomitosis
- Restitution nucleus
- Polyteny
- Haploidy

108. If there are 9 chromosomes in the antipodal cell of a monocot plant, what would be the number of chromosomes present in following structures?

- Secondary nucleus
- PEC
- Coleorhiza

- a-9, b-27, c-18
- a-27, b-27, c-9
- a-18, b-27, c-18
- a-18, b-27, c-9

109. Which of the following is matched incorrectly?

- Castor seed – Caruncle helps in hydrophily
- Beet – Residual, persistent nucellus in seeds
- Onion – Endospermic seed
- Groundnut – Ex-albuminous seed

110. Pollen viability

- Is period for which the pollen grains retain the ability to germinate on stigma in gymnosperms
- Is highly variable and depends on prevailing temperature and humidity
- For leguminosae, rosaceae and solanaceae pollen viability is 30 minutes
- It is several month in rice and wheat

111. Read the following statements and choose the correct option.

A. Generative cell in mature pollen grain is spindle shaped which floats in the cytoplasm of the vegetative cell.

B. In 40% of angiosperms, pollen grains are shed at 2-celled stage.

- Both are correct
- Only A is incorrect
- Only B is incorrect
- Both are incorrect

Space for Rough Work

Dermy
Hcell

Test - 1 (Code A)

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112. Megaspore mother cell differentiates from
- Nucellus in the chalazal region
 - Primary parietal cell in chalazal region
 - Nucellus in the micropylar region
 - Integumentary cell in micropylar region
113. To form three fully developed *Polygonum* type of embryo sacs in angiosperms, the total number of meiotic divisions and mitotic generations required are respectively
- 3, 9
 - 3, 3
 - 1, 3
 - 1, 9
114. Select the incorrect match.
- Ategmic ovule - *Capsella*
 - Orthotropous ovule - *Polygonum*
 - Campylotropous ovule - *Cruciferae*
 - Circinotropous ovule - *Opuntia*
115. In Mulberry, the location of flowers prevents
- Xenogamy
 - Autogamy but not geitonogamy
 - Geitonogamy but not autogamy
 - Both autogamy and geitonogamy
116. Which of the following prevents inbreeding depression?
- Synchronisation in pollen release and stigma receptivity
 - The anther and stigma placed at same positions
 - Presence of self-incompatibility
 - Presence of bisexual flowers
117. Read the following statements (w.r.t. pollen-pistil interaction).
- Dynamic process involving promotion or inhibition of the pollen followed by pollen recognition.
 - Knowledge in this area is helpful to plant breeders in manipulating pollen growth even in incompatible cases.
- (1) Only A is correct.
- (2) Both A & B are correct
- (3) Only B is correct
- (4) Both A & B are incorrect
118. Consider the following statements (a-d) w.r.t. anemophilous flower.
- Pollen grains are light, minute and sticky.
 - Numerous flowers packed into inflorescence.
 - Well-exposed stamens and short feathery stigma.
 - Flowers have a single ovule in each ovary.
- Which of the above statements are correct?
- b, c & d
 - a & d
 - a & b
 - c & d
119. Which of the following plant does not show hydrophily?
- Nelumbo*
 - Vallisneria*
 - Hydrilla*
 - Zostera*
120. All of the following statements are correct, except
- Filiform apparatus present at micropylar part of synergids guides the entry of pollen tube
 - Hybrid varieties of several of our food and vegetable crops are being extensively cultivated
 - In many *Citrus* and Mango varieties, some of the cells of nucellus surrounding the embryo sac start dividing, protrude into the embryo sac and develop into the embryos
 - Dormancy and hydration of mature seeds are crucial for storage of seeds
121. Mark the odd one w.r.t. Mendel's laws of inheritance.
- Conducted hybridisation experiments on *Pisum sativum* for seven years (1856 - 1863)
 - First time statistical analysis and mathematical logic were applied to problems in biology
 - Experiments had a small sampling size
 - He selected 14 true-breeding pea plant varieties

Space for Rough Work

$$9 : 3 : 3 : 1$$

$$\frac{9}{16}$$



122. Read the statements given below and select the correct option stating which ones are True (T) and which ones are False (F).

- A. Carl Correns gave Mendel's conclusions the shape of laws.
 B. Heterozygous plant (Tt) produces two kinds of gametes each having one allele with equal proportion.
 C. Two alleles of a gene pair are located on homologous chromosomes but on non-homologous sites.
 D. Movement of chromosomes to the poles occur during meiosis only.

| A | B | C | D |
|-------|---|---|---|
| (1) T | T | F | F |
| (2) F | F | T | T |
| (3) T | F | T | F |
| (4) T | T | F | T |

123. How many types of genotypes will be produced in a cross involving the genotypes CcDdEEFfgg and CcDdEEFfgg?

- (1) 6
 (2) 27
 (3) 7
 (4) 8

124. Select the odd one w.r.t incomplete dominance.

- (1) Genotypic and phenotypic ratios are the same in F_2 generation
 (2) Test cross produces two phenotypes
 (3) Phenotype of F_1 hybrid resembles both the parents
 (4) Flower colour of *Mirabilis jalapa* and *Antirrhinum majus* are two examples

125. Calculate the number of different genotypes in a population if a character is controlled by one gene that has 10 alleles?

- (1) 50
 (2) 40
 (3) 55
 (4) 10

126. Match the following Column I with Column II

| Column I (Non-allelic genetic interaction) | Column II (Dihybrid phenotypic ratio in F_2 generation) |
|-----------------------------------------------|--------------------------------------------------------------|
|-----------------------------------------------|--------------------------------------------------------------|

- a. Complementary gene (i) 9 : 3 : 4
 b. Recessive epistasis (ii) 9 : 7
 c. Polymeric gene (iii) 15 : 1
 d. Duplicate gene (iv) 9 : 6 : 1

- (1) a(ii), b(i), c(iii), d(iv)
 (2) a(iv), b(iii), c(ii), d(i)
 (3) a(iii), b(i), c(iv), d(ii)
 (4) a(ii), b(i), c(iv), d(iii)

127. Proportion of recombinant phenotypes in F_2 offsprings of Mendelian dihybrid cross is

- (1) $\frac{6}{16}$
 (2) $\frac{3}{16}$
 (3) $\frac{9}{16}$
 (4) $\frac{10}{16}$

128. $(N) \times (N - 1)$ gametic fusion will cause which of the following type of syndrome?

- (1) Klinefelter's syndrome
 (2) Down's syndrome
 (3) Turner's syndrome
 (4) Patau's syndrome

129. In *Drosophila*, Morgan found that genes for yellow body colour and white eyes were _____ and showed _____ recombinants in F_2 generation.

- (1) Completely linked, 0%
 (2) Loosely linked, 37.2%
 (3) Incompletely linked, 1.3%
 (4) Tightly linked, 38.5%

Space for Rough Work

- a. F
 b. T
 c. F
 d. C
 e. C
 Mark

(1) b

(3) a

131. Find disease

(1) T
 to

(2) D
 8

(3) T
 (4) B
 c

132. The p is ext has to

- (1) C
 (2) C
 (3) F
 (4) E

133. In *Dr* eye type, resu type are a

- w* v
 w* v
 w w
 w w

Test - 1 (Code A)

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130. Which of the following are associated with Down's syndrome?

a. Furrowed tongue

b. Tall stature

c. Palm crease

d. Gynaecomastia

e. Congenital heart disease

Mark the correct option

(1) b & c

(2) All, except b

(3) a, c & e

(4) b, d & e

131. Find the correct reason of Burkitt lymphoma disease.

(1) Translocation of a segment from chromosome 9 to 22

(2) Duplication of segments in chromosome 14 and 8

(3) Translocation between chromosome 14 and 8

(4) Deletion of segments from Philadelphia chromosome to 9

132. The possibility of a female becoming a haemophilic is extremely rare because mother of such a female has to be at least

(1) Carrier and father should be haemophilic

(2) Carrier and father should be normal

(3) Haemophilic and father should be normal

(4) Both should be normal

133. In *Drosophila*, two recessive genes produce white eye and miniature wings in contrast to their wild type, which results from the dominant alleles. The result from the cross between heterozygous wild type and homozygous recessive one, for both traits are as follows

w⁺ w m⁺ m = 66

w⁺ w m m = 39

w w m⁺ m = 35

w w m m = 60

In term of cross over units, how far apart are these two genes on the chromosome?

(1) 49 cM

(2) 37 cM

(3) 50 cM

(4) 63 cM

134. Butterfly is different from silkworm in

(1) Presence of two sex chromosomes in male individual

(2) Presence of two sex chromosomes in female individual

(3) Presence of only one sex chromosome in female individual

(4) Absence of one sex chromosome in male individual

135. According to the concept of dominance, the modified allele is equivalent to the unmodified allele when

(1) It produces normal enzyme

(2) It produces the same phenotype

(3) It produces non-functional enzyme

(4) Both (1) & (2)

136. The assisted reproductive technique in which the egg is first fertilized outside the body and then inserted into the fallopian tubes is

(1) MESA

(2) IUI

(3) ZIFT

(4) GIFT

137. Choose the incorrect statement

(1) Oestrous cycle is characteristic of monkeys

(2) Meiosis is an essential feature of sexually reproducing animals

(3) Iteroparous organisms produce offsprings in annual or seasonal cycles

(4) Asexual reproduction is also called agamogenesis

Space for Rough Work

138. The legally permissible use of the technique amniocentesis is for

- (1) Detecting sex of the foetus
- (2) Deciding on foeticide after undergoing sex determination through amniocentesis
- (3) Detecting genetic abnormalities in the foetus
- (4) MTPs which are performed usually beyond 25th week of pregnancy

139. Intensely lactating mothers do not generally conceive which is a natural method of contraception. It is due to

- (1) Hypersecretion of oxytocin
- (2) Suppression of release of gonadotropins by high level of prolactin
- (3) Suppression of ciliary motility in oviducts
- (4) Retardation of sperm movement through cervix

140. Vasectomy is generally a very successful method of contraception with least side effects. Yet it is not very common option preferred by males because

- (1) It is a surgical procedure
- (2) It is a common misconception that vasectomy reduces libido
- (3) Its effects are poorly reversible
- (4) All of these

141. Select the correct statement w.r.t. copper releasing IUDs amongst the following

- (1) Copper releasing IUDs suppress oogenesis
- (2) They can be generally inserted in the uterus by the user herself
- (3) These IUDs, once inserted, need not be replaced throughout the life
- (4) They increase the phagocytosis of sperms in the uterus

142. The process of release of mature spermatozoa from sertoli cells into the lumen of seminiferous tubules is called

- (1) Spermateliosis
- (2) Spermatidogenesis
- (3) Spermiation
- (4) Spermiogenesis

143. Human sperm has four parts i.e. head, neck, middle piece and tail.

Head has acrosome which is derived from

- (1) Mitochondria
- (2) Golgi body
- (3) Endoplasmic reticulum
- (4) Both (1) & (2)

144. Select the correct sequence of stages during sperm production

- (1) Spermatogonia → primary spermatocyte → spermatid → secondary spermatocyte → sperm
- (2) Spermatogonia → primary spermatocyte → secondary spermatocyte → spermatid → spermatozoa
- (3) Sperm → spermatogonia → primary spermatocyte → secondary spermatocyte → spermatid
- (4) Spermatid → spermatogonia → spermatozoa → secondary spermatocyte → primary spermatocyte

145. Match Column I with Column II and choose the correct answer.

Column I

- a. Implantation
- b. Seminal vesicles
- c. Inner cell mass
- d. Cleavage

Column II

- (i) Mitotic divisions of zygote
- (ii) Group of cells that would differentiate as embryo
- (iii) Provide energy and factors for coagulation of semen
- (iv) Embedding of blastocyst in the endometrium

Codes :

- (1) a(i), b(ii), c(iii), d(iv)
- (2) a(iv), b(iii), c(i), d(ii)
- (3) a(iv), b(iii), c(ii), d(i)
- (4) a(iii), b(i), c(iv), d(ii)

Space for Rough Work

Sp

146. In response to hormone one of the following

- (1) Progesterone
- (2) Luteal phase
- (3) Prolactin
- (4) CRH

147. Which of the following

- (1) LH surge
- (2) Mitochondria
- (3) Antifertilin
- (4) Proximal oocyte

148. What will be removed?

- (1) Ovary
- (2) Ovary
- (3) Ovary
- (4) Menstruation

149. Select the correct

- (1) Hymen
- (2) Mons pubis
- (3) The clitoris
- (4) Fingert

150. Read the

- (a) Cremaster
- (b) Sperm
- (c) Passing

Test - 1 (Code A)

parts i.e. head, neck, middle
which is derived from

um
ence of stages during sperm

primary spermatocyte →
secondary spermatocyte → sperm
primary spermatocyte →
secondary spermatocyte → spermatid →

matogonia → primary
secondary spermatocyte →

matogonia → spermatozoa →
matocyte → primary

column II and choose the.

Column II

- (i) Mitotic divisions of zygote
- (ii) Group of cells that would differentiate as embryo
- (iii) Provide energy and factors for coagulation of semen
- (iv) Embedding of blastocyst in the endometrium

- a(iv), b(iii), c(i), d(ii)
- a(iii), b(i), c(iv), d(ii)

Test - 1 (Code A)

146. In response to GnRH (gonadotropin releasing hormone), anterior pituitary secretes two hormones, one of which is FSH. The second one is

- (1) Progesterone
- (2) Luteinizing hormone (LH)
- (3) Prolactin
- (4) CRH

FSH and LH

147. Which of the following statements is incorrect?

- (1) LH stimulates the conversion of ruptured Graafian follicle into corpus luteum
- (2) Mitochondria are spirally arranged in the middle piece of male gamete (sperm)
- (3) Antifertilizins are present on female gametes
- (4) Proximal centriole enters into the secondary oocyte along with sperm head

148. What will happen when one ovary of a female is removed?

- (1) Ovulation will take place in alternate months
- (2) Ovulation will take place every month from remaining ovary
- (3) Ovulation will not take place at all
- (4) Menopause will occur immediately

149. Select the correct statement

- (1) Hymen is not a part of female external genitalia
- (2) Mons pubis is a cushion of fatty tissue covered by skin and not having pubic hair after puberty
- (3) The clitoris is a tiny finger like structure which lies at the upper junction of two labia minora above the urethral opening
- (4) Finger like projection on the edges of infundibulum help in collection of fertilised ovum

150. Read the following statements

- (a) Cremaster muscle and connective tissues form spermatic cord and surround all structures passing through inguinal canal.

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(b) In some mammals which breed seasonally, the testes descend into scrotum only during the breeding season e.g. in Bat and Otter

- (1) Only (b) is correct
- (2) Both (a) & (b) are correct
- (3) Both (a) & (b) are incorrect
- (4) Only (a) is correct

151. Which of the following are primary sex organs?

- (1) Fallopian tubes and vas deferens
- (2) Ovaries and testis
- (3) Penis and vagina
- (4) Epididymis and Labia majora

152. Choose the incorrect statement

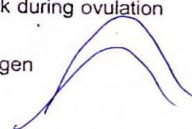
- (1) The labia minora of vulva are homologous to membranous urethra
- (2) The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex
- (3) Estrogens are steroid hormones produced by the ovarian follicles
- (4) The third trimester extends from the seventh month till birth

153. Umbilical cord of humans has

- (1) Two arteries only
- (2) Two veins and one artery
- (3) Two arteries and one vein
- (4) Two veins only

154. Which hormone's levels attain peak during ovulation in menstrual cycle?

- (1) Luteinizing hormone and estrogen
- (2) FSH and progesterone
- (3) Estrogen and CRH
- (4) Progesterone and estrogen



Space for Rough Work

155. Which type of cleavage occurs in humans zygote?

- (1) Meroblastic discoidal
(2) Meroblastic superficial
(3) Either (1) or (2)
(4) Holoblastic

156. Identify the **incorrect** statement w.r.t. human

- (1) The testes are situated outside the abdominal cavity in a pouch called scrotum
(2) The scrotum helps in maintaining the high temperature around the testes necessary for spermatogenesis
(3) Each seminiferous tubule is lined internally by two types of cells i.e. male germ cells and sertoli cells
(4) The regions outside the seminiferous tubules, called interstitial spaces, contain small blood vessels and interstitial cells

157. Read the following statements

- (a) An ideal contraceptive should be user friendly, easily available, effective and reversible with no or least side effects.
(b) Surgical methods of contraception are also called sterilisation.
(1) Both (a) & (b) are correct
(2) Both (a) & (b) are incorrect
(3) Only (b) is correct
(4) Only (a) is correct

158. Which term represents a condition of low sperm motility?

- (1) Cryptorchidism
(2) Oligospermia
(3) Vasectomy
(4) Asthenozoospermia

159. Which of the following is **correctly** matched w.r.t. menstrual cycle?

- (1) Corpus luteum - secretes progesterone after ovulation
(2) Rise in progesterone level - 1-14th days of menstrual cycle
(3) Endometrium regenerates - 1-5th days of menstrual cycle
(4) Release of ovum - 21st days before the end of the cycle

160. Select the **correct** match

| Column I | Column II |
|--------------------------------|--------------------------------|
| a. Kidney | (i) Mesodermal |
| b. Liver | (ii) Endodermal |
| c. Pineal gland | (iii) Ectodermal |
| d. Thymus | (iv) Endodermal |
| (1) a(iv), b(iii), c(ii), d(i) | (2) a(ii), b(iii), c(iv), d(i) |
| (3) a(i), b(ii), c(iv), d(iii) | (4) a(i), b(ii), c(iii), d(iv) |

161. Which type of placenta is present in humans?

- (1) Cotyledonary
(2) Haemochorial
(3) Syndesmochorial
(4) Contra deciduous

162. Cortical granules of the oocyte are involved in

- (1) Fast block to polyspermy
(2) Depolarization of oocyte plasma membrane
(3) Slow, permanent block to polyspermy
(4) Species specificity determination of fertilization process

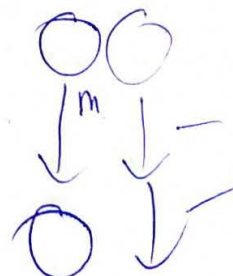
163. Select the **incorrectly** matched pair

- (1) Chlamydiasis - *Chlamydia trachomatis*
(2) Syphilis - *Treponema pallidum*
(3) Gonorrhoea - *Trichomonas vaginalis*
(4) Genital warts - *Human papilloma virus*

164. During oogenesis, the first meiotic division occurs in

- (1) Oogonium
(2) Primary oocyte
(3) Secondary oocyte
(4) Ootid

Space for Rough Work



Test - 1 (Code A)

- secretes progesterone after ovulation
- 1-14th days of menstrual cycle
- 1-5th days of menstrual cycle
- 21st days before the end of the cycle

Column II

- Mesodermal
- Endodermal
- Ectodermal
- Endodermal
- a(ii), b(iii), c(iv), d(i)
- a(i), b(ii), c(iii), d(iv)
- ent in humans?
- Haemochorial
- Contra deciduous
- are involved in
- asma membrane
- polyspermy
- ination of fertilization
- d pair
- a trachomatis
- a pallidum
- as vaginalis
- apilloma virus
- tic division occurs in
- primary oocyte
- otid

Test - 1 (Code A)

165. Temporary endocrine glands in human reproductive system is/are
- Mammary glands
 - Placenta
 - Bartholin gland
 - Both (1) & (2)
166. Which of the following is the correct sequence of embryonic development stages?
- Zygote → Morula → Blastocyst → Gastrula
 - Morula → Zygote → Blastocyst → Gastrula
 - Blastocyst → Zygote → Gastrula → Morula
 - Gastrula → Zygote → Blastocyst → Morula
167. Match the Column I with Column II and select the correct option from the choices given below
- | Column I | Column II |
|--------------|-------------------------|
| a. Condom | (i) Sheath of penis |
| b. Diaphragm | (ii) Covers cervix |
| c. IUD | (iii) Contains copper |
| d. Norplant | (iv) Implant under skin |
- a(i), b(iii), c(iv), d(ii)
 - a(ii), b(i), c(iii), d(iv)
 - a(i), b(ii), c(iii), d(iv)
 - a(iv), b(iii), c(ii), d(i)
168. Placenta produces several hormones during gestation. Select the correct option w.r.t. placental hormones
- Oxytocin and pitressin
 - ADH (Antidiuretic hormone) and pitocin
 - Human chorionic gonadotropin (hCG) and progesterone.
 - Estrogen and human placental lactogen (hPL).
- (b) & (d)
 - (a) & (c)
 - (a) & (b)
 - (c) & (d)
169. The method in which a sperm is directly injected into the ovum is
- GIFT
 - ICSI
 - IUI
 - AI

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170. What are the barrier methods used for birth control which also protect the user from contracting venereal diseases?
- Nirodh
 - Fem shields
 - Diaphragms and cervical caps
 - Both (1) & (2)
171. Which of the following statements is/are not correct about 'Saheli'?
- It is a non-steroidal preparation
 - It is taken once a week after initial intake of twice a week dose for three month
 - It inhibits implantation
 - Its active ingredient is progestin
172. Match Column I with Column II and select the correct option
- | Column I | Column II |
|---------------|------------------------------------------------------|
| a. Menarche | (i) End of menses |
| b. Menopause | (ii) Beginning of menses |
| c. Spermarche | (iii) The beginning of sperm production in testicles |
| d. Castration | (iv) Surgical removal of gonad |
- a(ii), b(i), c(iii), d(iv)
 - a(i), b(ii), c(iii), d(iv)
 - a(iv), b(iii), c(ii), d(i)
 - a(iii), b(iv), c(i), d(ii)
173. Select the correct sequence of layers around ovum from inside to outside
- Zona pellucida → plasma membrane → corona radiata
 - Plasma membrane → Zona pellucida → corona radiata
 - Corona radiata → plasma membrane → zona pellucida
 - Corona radiata → zona pellucida → plasma membrane

Space for Rough Work

174. Location of ostium of oviducts in humans is on

- (1) Infundibulum (2) ~~Fimbriae~~
(3) Isthmus (4) ~~Ampulla~~

175. Select the **incorrectly** matched pair

- (1) pH of semen - 7.2 to 7.7
(2) Seminal fluid - Contains fructose
(3) Interstitial cells - Endocrine cells of testis
(4) Prostate gland - One pair

176. The secondary oocyte, released during ovulation process, will complete its unequal meiosis II during fertilization in

- (1) Ovary
(2) Infundibulum of fallopian tubes
(3) ~~Ampulla of fallopian tubes~~
(4) Uterus

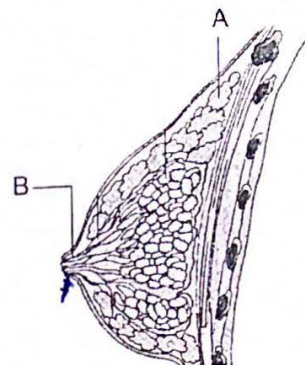
177. Choose the **incorrect** statement w.r.t. lactation

- (1) Oxytocin is milk let down hormone
(2) Milk let down is a neuro-endocrine reflex
(3) Colostrum is initial secretion from mammary glands soon after parturition
(4) ~~IgG provide active immunity through colostrum to newly born~~

178. Ectopic pregnancies are best explained as

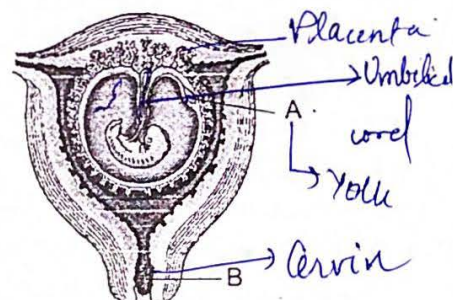
- (1) ~~Implantation of embryo at sites other than uterus~~
(2) Implantation of malformed embryo in the uterus
(3) Pregnancy terminated due to hormonal imbalance
(4) Pregnancies ending in premature parturition despite fundic implantation

179. In the diagram given below, identify the structures labelled as A & B



- (1) A- Mammary alveolus, B- Areola
(2) A- Fat, B- Lactiferous duct
(3) ~~A- Mammary lobe, B- Lactiferous duct~~
(4) A- Fat, B- Mammary duct

180. The following diagram shows an implanted human foetus in the uterus; with all supportive structures formed around it. The structures labelled A and B are



- (1) A- Umbilical cord, B- Cervical plug
(2) ~~A- Yolk sac, B- Plug of mucus in cervix~~
(3) A- Placental villi, B- Amnion
(4) A- Umbilical cord, B- Yolk sac



Space for Rough Work

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